

***What Is Claimed Is:***

1. A system for down-converting an electromagnetic signal having complex modulations, comprising:

an oscillator to generate an in-phase oscillating signal;

a phase shifter to receive said in-phase oscillating signal and to create a quadrature-phase oscillating signal;

a first universal frequency down-conversion module to receive the electromagnetic signal and said in-phase oscillating signal;

a second universal frequency down-conversion module to receive the electromagnetic signal and said quadrature-phase oscillating signal; wherein

said first universal frequency down-conversion module further comprising a first universal frequency transfer module and a first storage module, wherein said first universal frequency transfer module samples the electromagnetic signal at a rate that is a function of said in-phase oscillating signal, thereby creating a first sampled signal; and

said second universal frequency down-conversion module further comprising a second universal frequency transfer module and a second storage module, wherein said first universal frequency transfer module samples the electromagnetic signal at a rate that is a function of said quadrature-phase oscillating signal, thereby creating a second sampled signal.

2. The system of claim 1, wherein said quadrature-phase oscillating signal is out of phase with said in-phase oscillating signal by substantially 90°.

3. The system of claim 1, wherein said first storage device has a first storage first side and a first storage second side, said first storage first side being connected to said first sampled signal, and said first storage second side is connected to a first reference potential, and said second storage device has a second storage first side and a second storage second side, said second

storage first side being connected to said second sampled signal, and said second storage second side is connected to a second reference potential.

4. The system of claim 3, wherein said first storage device is a first capacitor, and said second storage device is a second capacitor.
5. The system of claim 3, wherein said first reference potential is substantially equal to ground, and said second reference potential is substantially equal to ground.
6. The system of claim 1, wherein the electromagnetic signal has a first frequency, said in-phase oscillating signal has a second frequency, and said first sampled signal has a first sampled frequency, and wherein said quadrature phase oscillating signal has a third frequency, and said second sampled signal has a second sampled frequency, wherein said first sampled frequency is substantially equal to the difference between said first frequency and “n” times said second frequency, where “n” is a subharmonic of said first frequency, and said second sampled frequency is substantially equal to the difference between said first frequency and “m” times said third frequency, where “m” is a subharmonic of said first frequency.
7. The system of claim 6, wherein “m” is substantially equal to “n.”
8. The system of claim 6, wherein said first sampled frequency is substantially equal to zero, and said second sampled frequency is substantially equal to zero.
9. The system of claim 1, wherein said first sampled signal is comprised of two or more voltage levels.
10. The system of claim 9, wherein said first sampled signal is comprised of eight voltage levels.

11. The system of claim 9, wherein said first sampled signal is comprised of sixteen voltage levels.
12. The system of claim 1, wherein said second sampled signal is comprised of two or more voltage levels.
13. The system of claim 12, wherein said second sampled signal is comprised of eight voltage levels.
14. The system of claim 12, wherein said second sampled signal is comprised of sixteen voltage levels.
15. The system of claim 1, wherein said first sampled signal is a first information output signal, and said second sampled signal is a second information output signal.
16. The system of claim 1, further comprising a first amplifier receiving said first sampled signal and outputting a first amplified signal, and a second amplifier receiving said second sampled signal and outputting a second amplified signal.
17. The system of claim 16, further comprising a first filter receiving said first amplified signal and outputting a first filtered signal, and a second filter receiving said second amplified signal and outputting a second filtered signal.
18. The system of claim 1, further comprising a first filter receiving said first sampled signal and outputting a first filtered signal, and a second filter receiving said second sampled signal and outputting a second filtered signal.

19. The system of claim 1, wherein the electromagnetic signal has been transmitted over a coaxial cable to a cable modem.

20. The system of claim 1, wherein the electromagnetic signal has been transmitted by a wireless method to a cable modem.

21. A multiphase transmitting system, comprising:

an oscillator to generate an in-phase oscillating signal;

a phase shifter to receive said in-phase oscillating signal and to create a quadrature-phase oscillating signal;

a first universal frequency translation module to receive said in-phase oscillating signal and a first information signal, wherein said in-phase oscillating signal causes said first universal frequency translation module to gate said first information signal and thereby generate a first periodic signal having a first plurality of harmonics, said first periodic signal having an amplitude that is a function of said first information signal;

a second universal frequency translation module to receive said quadrature-phase oscillating signal and a second information signal, wherein said quadrature-phase oscillating signal causes said second universal frequency translation module to gate said second information signal and thereby generate a second periodic signal having a second plurality of harmonics, said second periodic signal having an amplitude that is a function of said second information signal;

a summer coupled to said first universal frequency translation module and to said second universal frequency translation module, said summer to receive and combine said first periodic signal and said second periodic signal, and to output a combined periodic signal having a combined plurality of harmonics; and

a filter coupled to said summer, said filter to isolate at least one of said combined plurality of harmonics.

22. The multiphase transmitting system of claim 21, wherein said in-phase oscillating signal and said quadrature-phase oscillating signal have substantially the same frequency and are out of phase with each other by substantially 90°.

23. The multiphase transmitting system of claim 21, further comprising:

a first pulse shaping module connected to said first universal frequency translation module, said first pulse shaping module accepting said in-phase oscillating signal and outputting a first shaped oscillating signal, wherein said first shaped oscillating signal causes said first universal frequency translation module to gate said first information signal;

a second pulse shaping module connected to said second universal frequency translation module, said second pulse shaping module accepting said quadrature-phase oscillating signal and outputting a second shaped oscillating signal, wherein said second shaped oscillating signal causes said second universal frequency translation module to gate said second information signal.

24. The multiphase transmitting system of claim 21, wherein said first information signal is comprised of two or more voltage levels.

25. The multiphase transmitting system of claim 24, wherein said first information signal is comprised of eight voltage levels.

26. The multiphase transmitting system of claim 24, wherein said first information signal is comprised of sixteen voltage levels.

27. The multiphase transmitting system of claim 21, wherein said second information signal is comprised of two or more voltage levels.

28. The multiphase transmitting system of claim 27, wherein said second information signal is comprised of eight voltage levels.

29. The multiphase transmitting system of claim 27, wherein said second information signal is comprised of sixteen voltage levels.

30. The multiphase transmitting system of claim 21, wherein said filter isolates an output signal, said output signal being transmitted from a cable modem over a coaxial cable.

31. The multiphase transmitting system of claim 21, wherein said filter isolates an output signal, said output signal being transmitted from a cable modem via a wireless method.

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